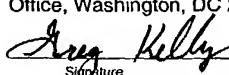


JC10 Rec'd PCT/PTO 12 DEC 2001

FORM PTO-1390 (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 42390.P9659
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/018517
INTERNATIONAL APPLICATION NO. PCT/CN00/00265	INTERNATIONAL FILING DATE 07 September 2000 (07.09.00)	PRIORITY DATE CLAIMED	
TITLE OF INVENTION Method and Apparatus for Summarizing Multiple Documents Using a Subsumption Model			
APPLICANT(S) FOR DO/EO/US LIU, Weiquan & ZHOU, Joe F.			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> has been communicated by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> is attached hereto.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> have been communicated by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p style="margin-left: 20px;">d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>			
Items 11 to 20 below concern document(s) or information included:			
<p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment.</p> <p>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: Return Postcard</p>			
<p>I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail Label # EL 546 267 105 US in an envelope addressed to: Assistant Commissioner of Patents, US Patent and Trademark Office, Washington, DC 20231, Box PCT.</p> <p style="text-align: center;">  12/12/01 </p> <p style="text-align: center;"> <small>Signature</small> <small>Date</small> </p>			

J005 Rec'd PCT/PTO 12 DEC 2007

U.S. APPLICATION NO. (if known, see 37 CFR 1.53) 10/018517		INTERNATIONAL APPLICATION NO. PCT/CN00/00265		ATTORNEY'S DOCKET NUMBER 42390.P9659	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO 890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 1,040.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	18 - 20 =	0	\$18.00	\$ 0.00	
Independent claims	3 - 3 =	0	\$84.00	\$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				\$ 0.00	
TOTAL OF ABOVE CALCULATIONS =				\$ 1,040.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$ 0.00	
SUBTOTAL =				\$ 1,040.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ 0.00	
TOTAL NATIONAL FEE =				\$ 1,040.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$ 0.00	
TOTAL FEES ENCLOSED =				\$ 1,040.00	
				Amount to be refunded:	\$
				charged:	\$

a. ☒ A check in the amount of \$ 1,040.00 to cover the above fees is enclosed.

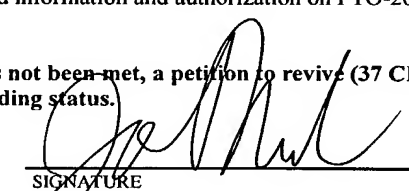
b. ☐ Please charge my Deposit Account No. 02-2666 in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 02-2666. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card
information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
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United States of America



SIGNATURE
John P. Ward

NAME
40,216

REGISTRATION NUMBER

METHOD AND APPARATUS FOR SUMMARIZING MULTIPLE DOCUMENTS
USING A SUBSUMPTION MODEL

FIELD OF INVENTION

The present invention relates to the field of natural language processing, information retrieval, information extraction, and automatic summary and abstraction generation.

BACKGROUND OF THE INVENTION

The advent of the Information Age has brought with it an increase in the accessibility of data, accompanied by schemes for searching that data. One searching for specific data through the Internet or in other information systems using any of many search engines available is often presented with an lengthy list of documents which may or may not contain the data for which he was searching. Reading through such a lengthy list is undesirably time consuming.

To reduce the time needlessly wasted in such reading, a variety of technologies have been presented for summarizing multiple documents to express a theme central to these documents. However, all of these technologies are inherently limited in some aspect. Some are able to search only a specific domain of knowledge and are therefore difficult to implement for different applications. Some, without radical modification, can only search documents composed in certain languages. Some use deep language parsing, statistical, or term-vector based techniques, resulting in longer waits for search results and greater demands on computing resources. Almost all generate summaries by merely

concatenating together text segments containing some keyword, often producing results which are incohesive due to anaphoric ambiguity. None use real natural language analyzing techniques. A method for summarizing multiple documents while avoiding these limitations is desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements, and in which:

Figure 1 is a flow diagram of one embodiment of a method for summarizing multiple documents using a subsumption model.

Figure 2 is a flow diagram of one embodiment of parsing a plurality of documents.

Figure 3 is a flow diagram of one embodiment of selecting paragraphs from the documents through subsuming relation calculation.

Figure 4 is a flow diagram of one embodiment of rewriting the selected paragraphs into a summary.

Figure 5 is an example of one embodiment of linking entity names in paragraphs of documents.

Figure 6 is an example of one embodiment of a computer system.

DETAILED DESCRIPTION

In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

Figure 1 is a flow diagram of one embodiment of a method for summarizing multiple documents using a subsumption model. In one embodiment, the content of the documents are co-related to one central topic. First, a plurality of documents are parsed, step 101. Then paragraphs are selected from the documents through subsuming relation calculation, step 102. Finally, the selected paragraphs are rewritten into a summary, step 103. Each of these steps is described in greater detail below.

Figure 2 is a flow diagram of one embodiment of parsing a plurality of documents, corresponding to step 101 of Figure 1. In one embodiment, parsing is accomplished by applying shallow natural language processing to text.

First, noun phrases and verb phrases are extracted from the documents, step 201. To accomplish this, the words in the documents are tagged according to their respective parts-of-speech. A set of rules is applied to bracket out the noun phrases and verb phrases in the documents by matching the part-of-speech tags according to predefined patterns. The noun phrases are further analyzed to identify entity names. A word with the first letter in uppercase denotes that it is part of an entity name. The use of entity name, noun phrase, and verb phrase recognition captures the features of documents while limiting the overhead involved in parsing to a minimum.

Next, the noun phrases that are entity names are categorized, step 202.

Exemplary categories include people's names, company and organization names, addresses, currency amounts, dates, geographical locations, measurements, etc. In an embodiment where the documents all relate to one central topic, the detected noun phrases, verb phrases, and entity names have much in common.

Finally, the entity names are converted into canonical form, step 203. For example, "06/26/00" would be converted to "June 26, 2000". The identified entity names are input into a subsuming relation calculation.

Figure 3 is a flow diagram of one embodiment of selecting, or in other words, extracting, paragraphs from the documents through subsuming relation calculation, corresponding to step 102 of Figure 1. In one embodiment, the subsuming relation calculation is designed to calculate the inherent subsumption between paragraphs from each document. This process determines the significance of each paragraph. The noun phrases, verb phrases and/or entity names in the documents represent the content of those documents. Different paragraphs may share common noun/verb phrases and entity names. For example, if all the noun/verb phrases and entity names in a paragraph A are also in a paragraph B, then B subsumes A.

First, noun/verb phrases and entity names in each paragraph of every document are linked with identical noun/verb phrases and entity names in other paragraphs of each document, step 301. Reference links are built between the common phrases and entity names shared by paragraphs. Figure 5 discussed below illustrates an example of one embodiment of linking entity names in paragraphs of documents having a common topic independent of domain and being composed in a language other than English.

Next, the links for each paragraph are counted, step 302. The link count may be called a significance score. If a paragraph has more reference links, it is more significant than other paragraphs in representing the meaning of the documents. The more other paragraphs a given paragraph subsumes, the richer it is in content in comparison to the other paragraphs subsumed. Then, the paragraphs from the plurality of documents are ranked by their significant scores, step 303. The paragraphs with the most subsumption are relatively more dominative and informative. Therefore, these paragraphs are extracted, or in other words selected, prior to other paragraphs. In one embodiment, the top N paragraphs are bulleted, where N can be a predefined length factor decided jointly by an empirical function and a user's preference, step 304. The extracted paragraphs selected by the subsumption model are typically informative enough to represent the content of the central topic.

In one embodiment, the subsuming relation calculation is domain independent. It can process documents of a variety of topics. It does not assume any domain knowledge adaptation. Thus, it is relatively easy to implement for different applications.

Unlike other summarization systems, no statistic technique is used in the subsuming relation calculation. Therefore, no background corpus is needed to build a base frequency. The domain and length of the documents are not limited. The subsuming relation calculation is also not term-vector based, avoiding high dimension vector manipulation.

Figure 4 is a flow diagram of one embodiment of rewriting the selected paragraphs into a summary, corresponding to step 103 of Figure 1. First, the paragraphs are ranked, step 401, by their significance score. In one embodiment, the top N

paragraphs are bulleted, where N can be a predefined length factor decided jointly by an empirical function and a user's preference. Cohesiveness is less likely if these bulleted paragraphs are output as a summary without further processing. So a co-reference resolution algorithm is applied to the paragraphs, step 402, to resolve anaphoric ambiguity. There are a number of such algorithms in the public domain. By introducing the co-reference resolution, most anaphoric ambiguity is removed, thus making the result summary more cohesive.

For example, a document might read, "I met John and Mary this morning. He was driving a red car. It's a nice sports car. She was very happy." A reader may not notice any co-reference ambiguity in it, since it's obviously that "*he*" stands for *John*, "*she*" stands for *Mary* and "*it*" stands for the car. But the method and apparatus disclosed herein extracts the significant paragraphs (or sentences) for multiple documents and concatenates them into one text passage as a summary, and because these paragraphs may come from different documents, or different parts of the same document, they may contain pronouns that may refer to entity names in paragraphs that were not extracted and do not appear in the resulting summary. To reduce reader confusion, a one-to-one reference relation is built between each pronoun and its equivalent entity name.

Finally, the pronouns (for example, he, she, it, they, etc.) in the paragraphs are replaced with their full entity name antecedents, step 403. Thus, the readability of the output summary is improved.

The subsuming relation calculation can be applied to languages other than English. To apply the calculation to another language, only the shallow natural language

processing and co-reference resolution components need to be modified. The core subsumption model is language independent.

Figure 5 is an example of one embodiment of linking identical entity names in paragraphs of documents having a common topic independent of domain and being composed in a language other than English. One paragraph 501 contains entity names which are also contained in another paragraph 502. The identical entity names in each paragraph are linked according to the flow diagram in Figure 3. Because all of the entity names in paragraph 501 are also contained in paragraph 502, paragraph 502 can be said to subsume paragraph 501.

The method and apparatus disclosed herein may be integrated into advanced Internet- or network-based knowledge systems as related to information retrieval, information extraction, and question and answer systems. Figure 6 is an example of one embodiment of a computer system. The system shown has a processor 601 coupled to a bus 602. Also shown coupled to the bus are a memory 603 which may contain instructions 604. Additional components shown coupled to the bus are a storage device 605 (such as a hard drive, floppy drive, CD-ROM, DVD-ROM, etc.), an input device 606 (such as a keyboard, mouse, light pen, bar code reader, scanner, microphone, joystick, etc.), and an output device (such as a printer, monitor, speakers, etc.). Of course, an exemplary computer system could have more components than these or a subset of the components listed.

The method described above can be stored in the memory of a computer system (e.g., set top box, video recorders, etc.) as a set of instructions to be executed, as shown by way of example in Figure 6. In addition, the instructions to perform the method

described above could alternatively be stored on other forms of machine-readable media, including magnetic and optical disks. For example, the method of the present invention could be stored on machine-readable media, such as magnetic disks or optical disks, which are accessible via a disk drive (or computer-readable medium drive). Further, the instructions can be downloaded into a computing device over a data network in a form of compiled and linked version.

Alternatively, the logic to perform the methods as discussed above, could be implemented in additional computer and/or machine readable media, such as discrete hardware components as large-scale integrated circuits (LSI's), application-specific integrated circuits (ASIC's), firmware such as electrically erasable programmable read-only memory (EEPROM's); and electrical, optical, acoustical and other forms of propagated signals (e.g., carrier waves, infrared signals, digital signals, etc.); etc.

Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the invention. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

CLAIMS

What is claimed is:

1. A computer-implemented method comprising:
parsing a plurality of documents;
selecting paragraphs from the documents through subsuming relation calculation;
and
rewriting the selected paragraphs into a summary.
2. The method of claim 1 wherein parsing further comprises:
extracting noun phrases and verb phrases from the documents;
categorizing the noun phrases that are entity names; and
converting the entity names into canonical form.
3. The method of claim 1 wherein subsuming relation calculation further comprises:
linking noun phrases, verb phrases or entity names in each paragraph of every
document with identical noun phrases, verb phrases or entity names in every other
paragraph of every document;
and
counting the links for each paragraph.
4. The method of claim 1 wherein rewriting further comprises:
ranking the paragraphs;

applying a co-reference resolution algorithm to the paragraphs; and
replacing pronouns in the paragraphs with their full entity name antecedents.

5. The method of claim 1 wherein the documents have a common topic independent of domain.

6. The method of claim 1 wherein the documents are composed in English or in a language other than English.

7. A machine readable medium having stored thereon sequences of instructions which are executable by a processor, and which, when executed by the processor, cause the system to perform a method comprising:

parsing a plurality of documents;

selecting paragraphs from the documents through subsuming relation calculation;

and

rewriting the selected paragraphs into a summary.

8. The medium of claim 7 wherein parsing further comprises:
extracting noun phrases and verb phrases from the documents;
categorizing the noun phrases that are entity names; and
converting the entity names into canonical form.

9. The medium of claim 7 wherein subsuming relation calculation further comprises:

linking noun phrases, verb phrases or entity names in each paragraph of every document with identical noun phrases, verb phrases or entity names in every other paragraph of every document; and
counting the links for each paragraph.

10. The medium of claim 7 wherein rewriting further comprises:
ranking the paragraphs;
applying a co-reference resolution algorithm to the paragraphs; and
replacing pronouns in the paragraphs with their full entity name antecedents.
11. The medium of claim 7 wherein the documents have a common topic independent of domain.
12. The medium of claim 7 wherein the documents are composed in English or in a language other than English.
13. An system comprising:
a processor;
a bus coupled to the processor; and
a unit coupled to the bus to parse a plurality of documents, select paragraphs from the documents through subsuming relation calculation, and rewrite the selected paragraphs into a summary.

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14. The system of claim 13 wherein the unit further extracts noun phrases and verb phrases from the documents, categorizes the noun phrases that are entity names, and converts the entity names into canonical form.
15. The system of claim 13 wherein the unit further links noun phrases, verb phrases or entity names in each paragraph of every document with identical noun phrases, verb phrases or entity names in every other paragraph of every document, and counts the links for each paragraph.
16. The system of claim 13 wherein the unit further ranks the paragraphs, applies a co-reference resolution algorithm to the paragraphs, and replaces pronouns in the paragraphs with their full entity name antecedents.
17. The system of claim 13 wherein the documents have a common topic independent of domain.
18. The system of claim 13 wherein the documents are composed in English or in a language other than English.

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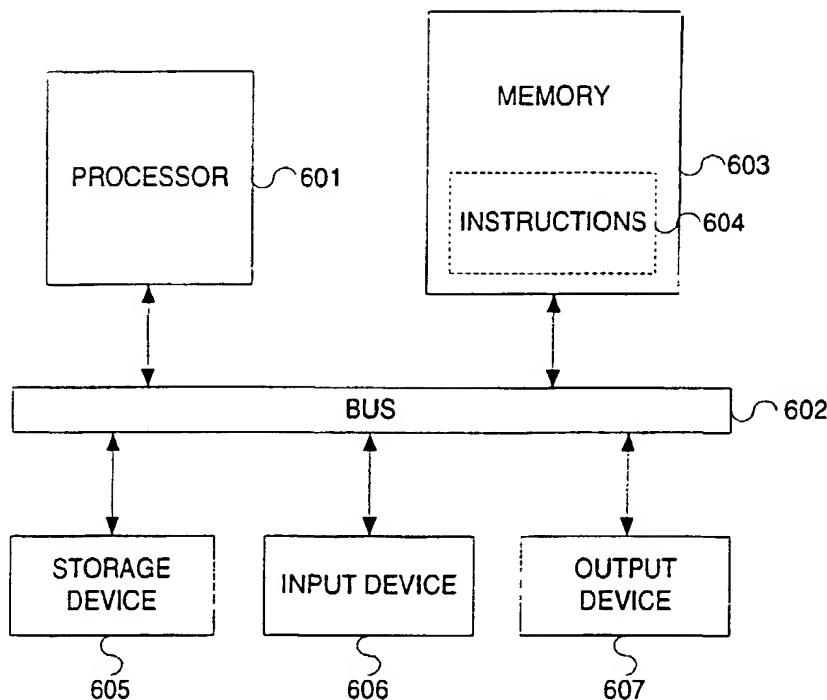
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Published:

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[Continued on next page]

(54) Title: **METHOD AND APPARATUS FOR SUMMARIZING MULTIPLE DOCUMENTS USING A SUBSUMPTION MODEL**



(57) Abstract: A method and apparatus for parsing a plurality of documents, selecting paragraphs from the documents through subsuming relation calculation, and rewriting the selected paragraphs into a summary is disclosed.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette

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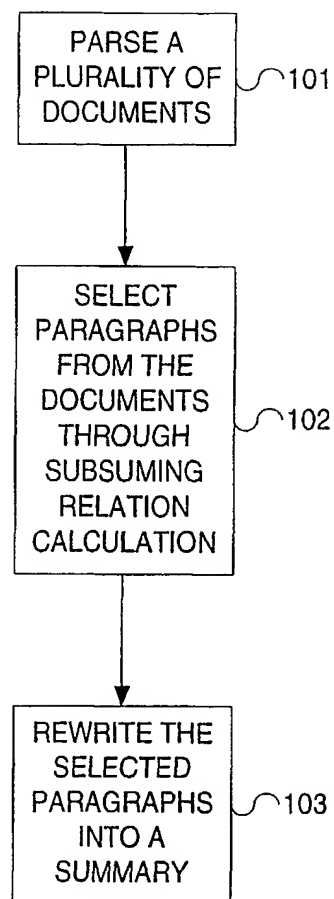


FIG. 1

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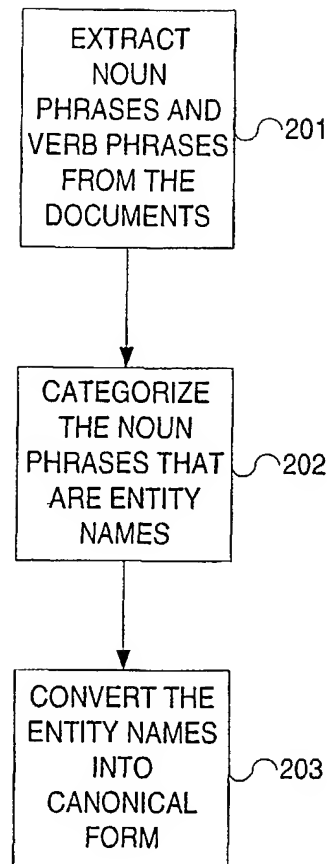


FIG. 2

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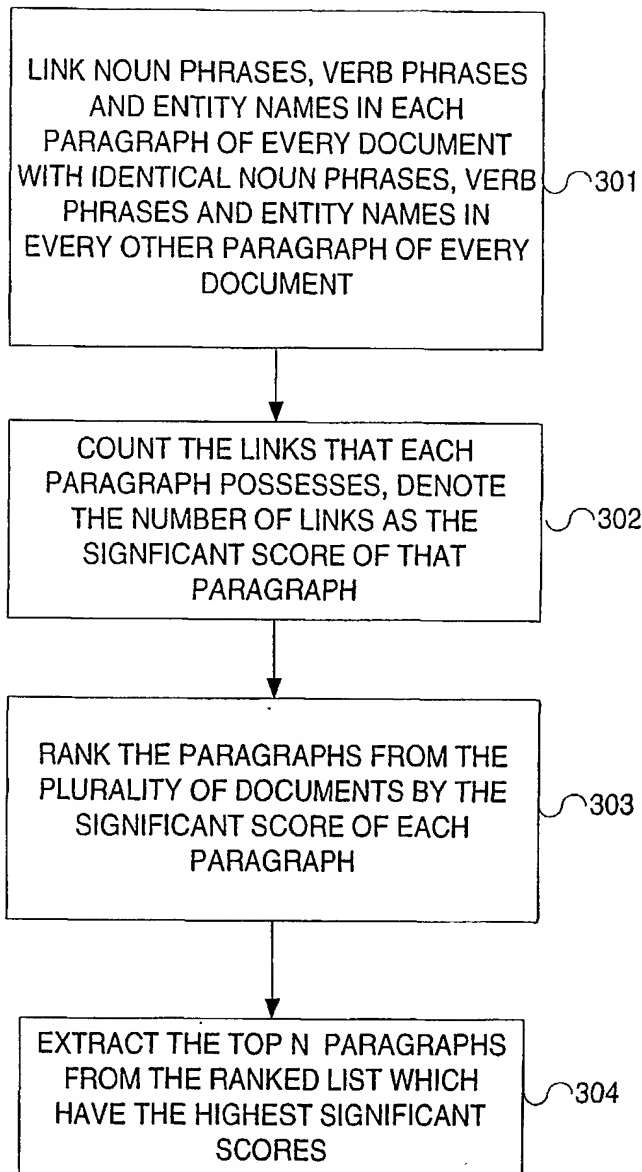


FIG. 3

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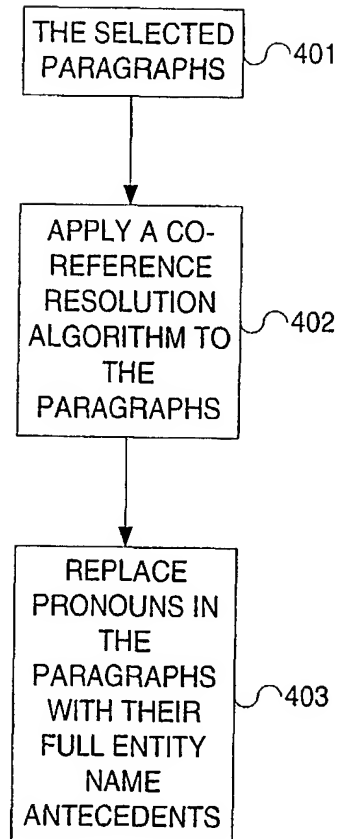
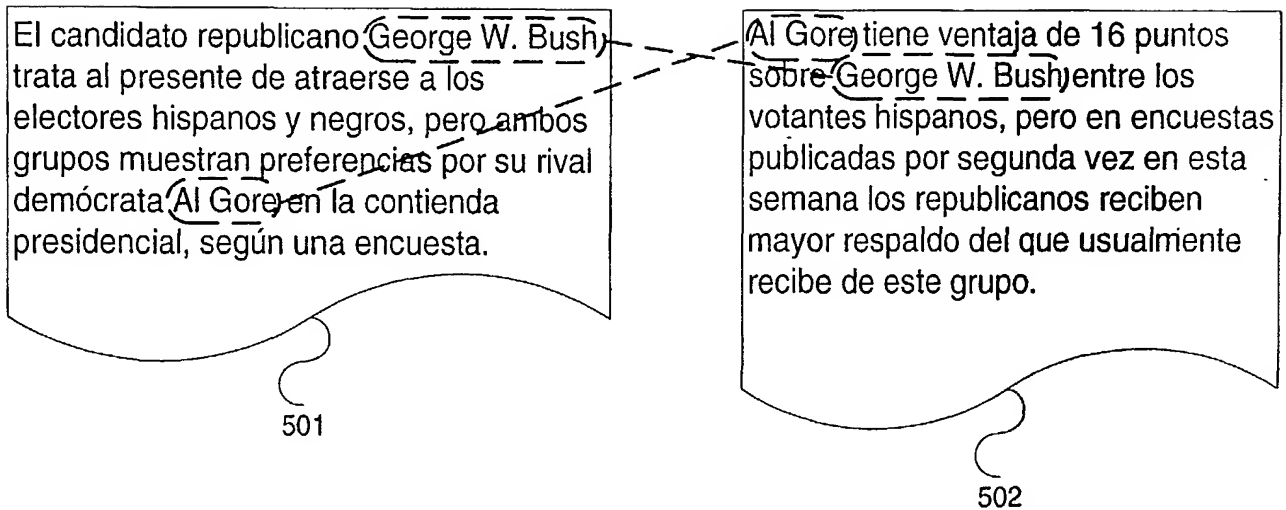


FIG. 4

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FIG. 5



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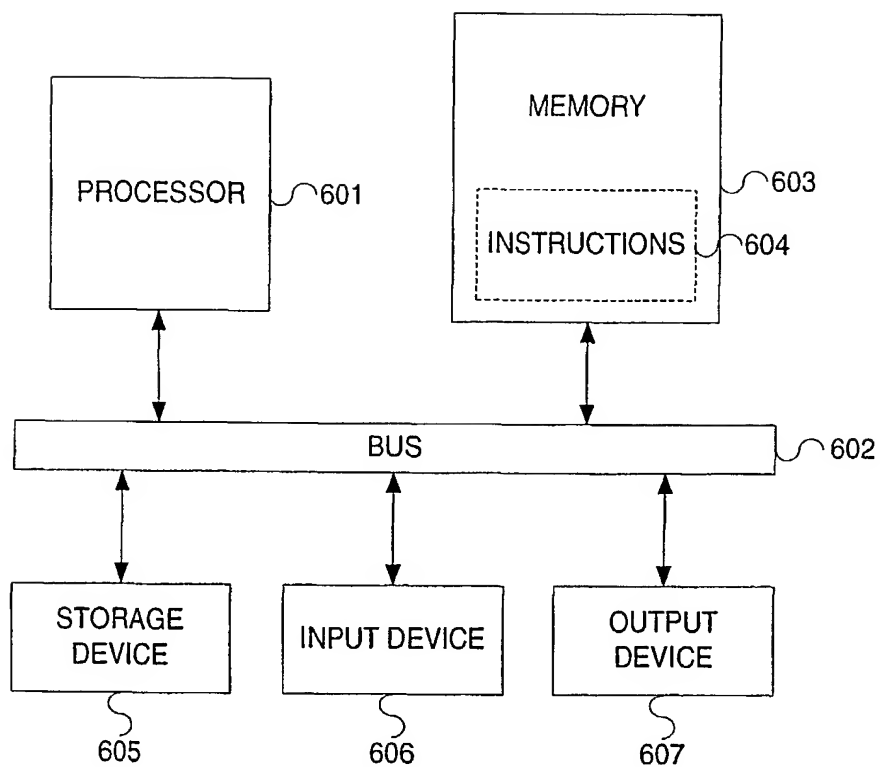


FIG. 6

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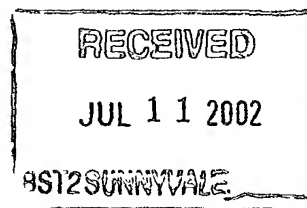
CAPINFO

2002

To: John P. Ward

INTEL CORPORATION
Rev. 05/09/02 (D3 INTEL)
Attorney's Docket No.: 42300, F9659

PATENT



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
(FOR INTEL CORPORATION PATENT APPLICATIONS)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled METHOD AND APPARATUS FOR SUMMARIZING MULTIPLE DOCUMENTS USING A SUBSUMPTION MODEL, the specification of which

is attached hereto
X was filed on 08/07/2000 as
United States Application Number _____
or PCT International Application Number PCT/CN00/00265
and was amended on (MM/DD/YYYY) _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claim(s) as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application. I do not know and do not believe that the claimed invention was in public use or on sale in the United States of America more than one year prior to this application, nor do I know or believe that the invention has been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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FAX NO. : 07556790332

FROM : ZTE

Prior Foreign Application(s) ☐ Priority ☐ Claimed ☐

(Number) (Country) (Foreign Filing Date - Yes No
MM/DD/YYYY)

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

Application Number (Filing Date MM/DD/YYYY)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Application Number (Filing Date MM/DD/YYYY)
Status -- patented, ☐ pending, ☐ abandoned ☐

I hereby appoint the persons listed on Appendix A hereto (which is incorporated by reference and a part of this document) as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

Send correspondence to John P. Ward, Esq., BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP, 12400 Wilshire Boulevard 7th Floor, Los Angeles, California 90025 and direct telephone calls to John P. Ward, Esq., (408) 720-8300.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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APPENDIX A

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APPENDIX B

Title 37, Code of Federal Regulations, Section 1.56 Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.